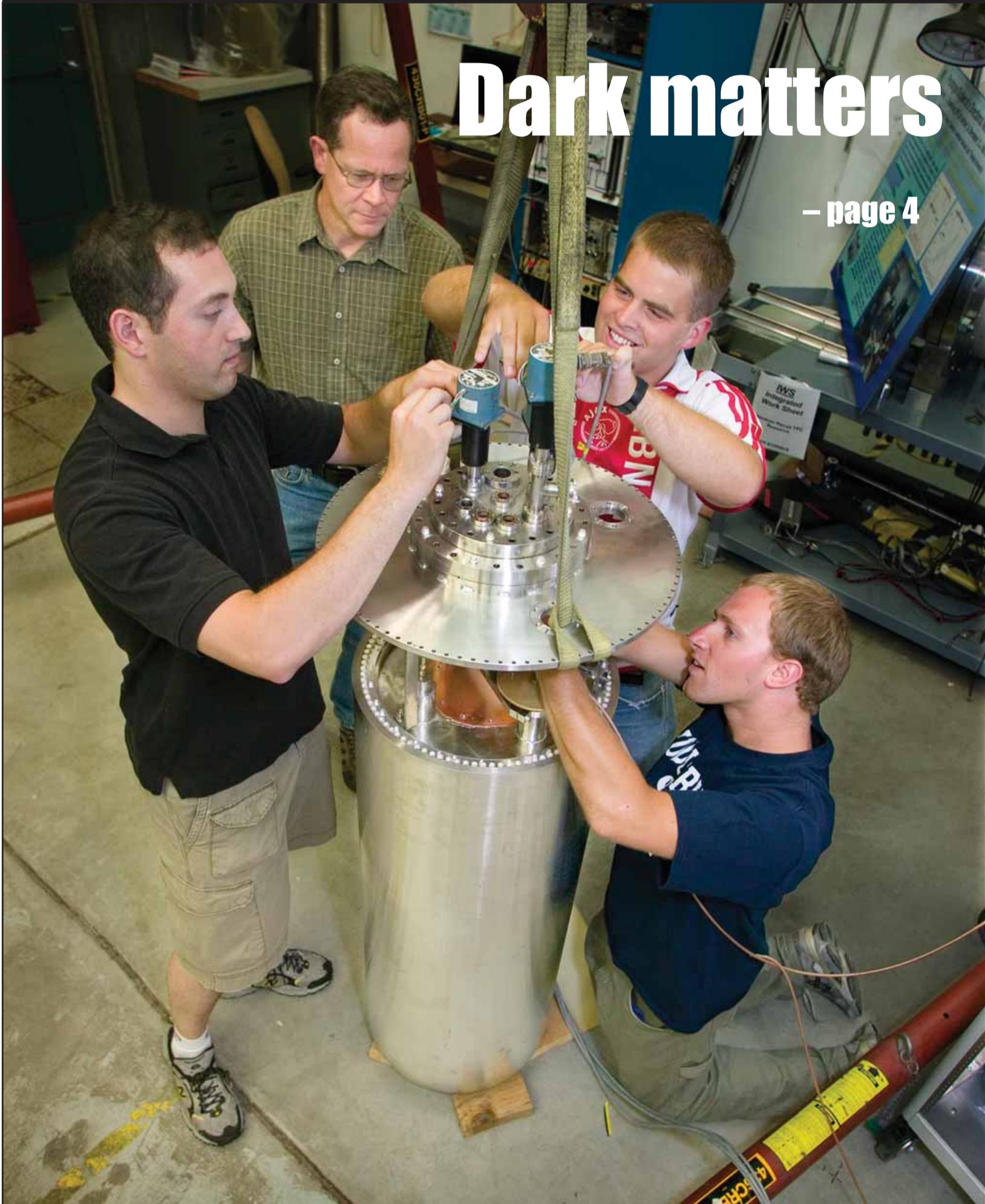


NEWSLINE

Published for the employees of Lawrence Livermore National Laboratory

August 11, 2006

Vol. 31, No. 16



Dark matters

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WILDSIDE:
TRICOLORED BLACK
BIRD

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LAB ANNOUNCEMENTS

Lab offers training critical to handling nuclear materials

By Bob Hirschfeld
Newsline

There was no school band playing “Pomp and Circumstance,” but a handful of graduates received diplomas last week after completing a unique nuclear criticality training course offered by the Lab.

Until recently, all DOE national lab workers who handle special nuclear materials (SNM) were required to undergo training at Los Alamos National Laboratory (LANL).

Criticality safety is an essential element in training of National Nuclear Security Administration (NNSA) workers who handle or otherwise deal with SNM. However, in recent years, facility closures at other NNSA sites resulted in the elimination of the “hands-on” portions of the training. This negatively affected the quality of criticality safety training in the NNSA complex, and was identified as such by the Defense Nuclear Facilities Safety Board.

So last March, NNSA turned to Lawrence Livermore. And in just four months, the nuclear criticality training curriculum was developed and approved, along with all the necessary Superblock facility modifications and safety considerations.

The first class was comprised primarily of criticality safety professionals from LANL, Oak Ridge National Laboratory (ORNL), and Savannah River. Criticality Safety Engineer Catherine Goff observed that for some



NANCY RUTTER/TID

With her gloved hand on a uranium test assembly, Barbara Krögfuss of Y-12 participates in a nuclear criticality training exercise with LLNL certified fissile material handler Nolan Lomba (right), as Mark Lee of the Livermore Site Office looks on.

participants, this was the first time they had actually worked with SNM.

Training modules included classroom sessions involving regulatory and safety issues, as well as several trips to the Superblock for hands-on experiments involving fissile materials, super-

vised by senior LLNL certified material handlers.

In addition, participants dealt with a criticality accident scenario. “We usually focus most of our attention on accident prevention. But we also need to keep in mind how to deal with the

unexpected, if it were to happen,” said Dave Heinrichs, LLNL Criticality Safety Section project co-leader and course instructor.

The Criticality Safety Section designed the technical content and experiments, and taught the courses. NAI’s R-Division contributed neutron detection expertise and the detection devices. The Nuclear Materials Technology Program provided the technical and operational support needed to conduct the hands-on portion of the class.

Mark Lee of DOE’s Livermore Site Office was involved in the early planning for the course, and assisted with the authorization process. He acted as an instructor for the regulatory module, and then switched roles and became a student for the rest of the course. Lee said, “The Lab has shown a high degree of professionalism and teamwork in putting this class together, from project managers to fissile handlers; it is very impressive to do this in less than a year’s time.”

“A course like this requires a lot of infrastructure and coordination,” said Tom Meier, engineer and project co-leader with the Lab’s Nuclear Materials Technology Program, which provided Superblock facility capabilities, as well as personnel for material management, support and engineering assistance.

Three additional sessions will be taught in coming weeks, and beginning in FY07, the class will be offered monthly.

UC visit

From left, Vince Stewart, director of federal government relations at UC Davis, and John Hamilton, deputy director of federal government relations at UCOP, listen as John Knezovich, director of the Center for Accelerator Mass Spectrometry, explains how the system works. Stewart and Hamilton visited the Lab Tuesday and received an overview of a variety of science and technology projects.



JACQUELINE MCBRIDE/NEWSLINE

New barcode system makes biodetection easier

By Anne M. Stark
Newsline staff writer

Detecting biowarfare agents in the field will become a lot easier thanks to a new barcode system based on biosensing nanowires developed by Laboratory researchers.

The researchers, led by Jeffrey Tok of LLNL's BioSecurity and Nanosciences Laboratory, built submicrometer layers of different metals including, gold, silver and nickel that act as "barcodes" for detecting a variety of pathogens ranging from anthrax, smallpox and ricin to botulinum.

The team, led by LLNL and including researchers from Stanford University, the UC-Davis Center for Biophotonics and Nanoplex Technologies, used the multi-stripped metallic nanowires in a suspended format to rapidly identify sensitive single and multiplex immunoassays that simulated biowarfare agents.

The researchers produced nanoscale wires by electrochemically depositing metals within the tiny cavities of porous mineral solids. They then

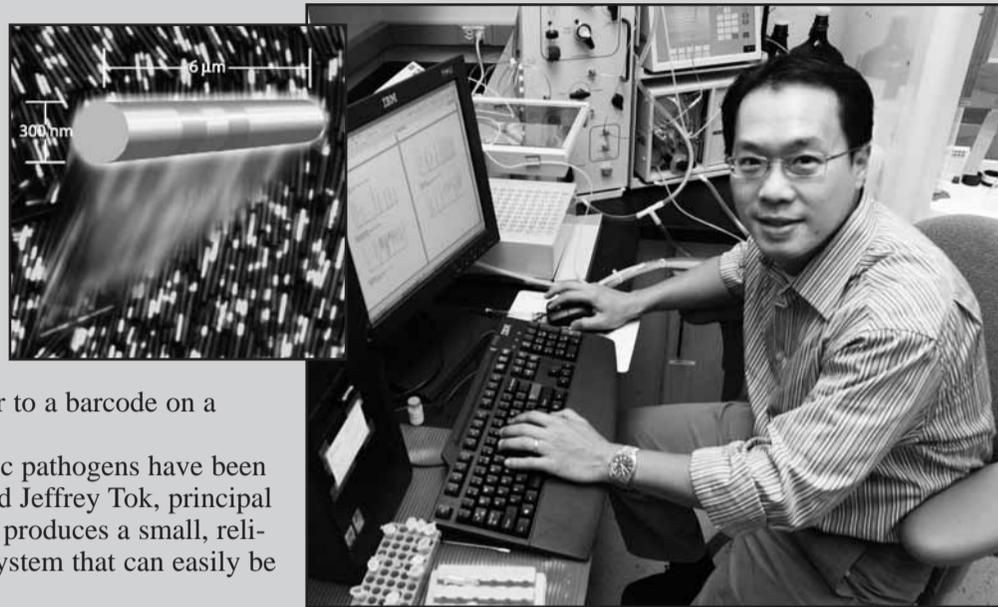
layered the gold and silver in a specific way to produce nanowires with different characteristic stripe patterns depending on which pathogen they were trying to identify.

The reflection pattern and fluorescence from each stripe sequence can later be clearly recognized, similar to a barcode on a retail product.

"Antibodies of specific pathogens have been attached to the wires," said Jeffrey Tok, principal author from LLNL. "This produces a small, reliable, sensitive detection system that can easily be taken into the field."

The system not only applies to biowarfare agents, but could also be used during an outbreak of an infectious disease.

The research appears online in the journal *Angewandte Chemie*.



JACQUELINE MCBRIDE/NEWSLINE

Principal investigator Jeffrey Tok demonstrates how multi-metallic striped nanowires (inset) are used to enable rapid and sensitive single- and multiplex immunoassays for biowarfare agents.

Surveillance system receives award from U.S. Army

By Stephen Wampler
Newsline staff writer

Two Lab employees are part of a U.S. Army, U.S. Air Force and industrial team that has won an award for developing around-the-clock surveillance technology for tracking terrorists and protecting the U.S. military.

Jim Trebes of M Division and Mike Newman, a senior technical associate in Electronics Engineering who has made three trips to Iraq, worked on a surveillance technology that won an award as one of the U.S. Army's "Ten Greatest Inventions" for 2005.

These awards are given for their impact on Army capabilities, inventiveness and potential use outside the Army.

Trebes was the lead independent evaluator during systems integration and testing at Yuma Proving Grounds from June through August in 2004.

Newman was part of the site survey team that spent 10 days in Iraq in May 2004. He served as the chief systems integrator and the technical lead for 19 people from several different companies during a stay of 7 1/2 weeks in September and October 2004. Newman also returned to Iraq for three weeks in September 2005 to assist in upgrading the system.

Among the key organizations working on the surveillance technology are the U.S. Army's Program Management for Robotics and Unmanned Sensors and the U.S. Army Research Laboratory, as well as engineers and researchers from Lockheed Martin.

The surveillance technology has been operational in Iraq since October 2004. It has aided U.S. forces in stopping a number

of terrorist attacks, as well in capturing terrorists and discovering a number of weapons caches.

More surveillance systems are under development for deployment in Iraq and Afghanistan.

Newman credited a number of Lab employees for their assistance with the project, including retiree Milt Finger, the former head of Department of Defense Programs at LLNL; Mark Strauch, Safeguards and Security; Gary Stone, M Division; Ron Shaw, Electronics Engineering; Mark Vigers, Mechanical Engineering; JoAn Levy, secretarial support; and Pam Richmond, a resource manager.



Mike Newman, who has made three trips to Iraq, worked on a surveillance technology that won an award as one of the U.S. Army's "Ten Greatest Inventions" for 2005.

Paper addresses contract questions

In response to questions from LLNL employees, NNSA's Source Evaluation Board (SEB) has issued a white paper discussing a variety of human resources issues regarding LLNL's transition to a new contractor. The Introduction to the white paper, "Contractor Human Resources Issues," reads as follows:

"The NNSA Source Evaluation Board (SEB) has received questions from Lawrence Livermore National Laboratory (LLNL) employees about clause H-35, Workforce Transition, Contractor Compensation, Benefits and Pension, in the Request for Proposals (RFP) for management and operation of LLNL. This paper is intended to address the issues raised in the questions. Related questions were binned into categories and answers for each category are provided (in the paper). When it was not possible to bin a question into a category, it was included under "Miscellaneous" along with the response to the question."

To view the NNSA white paper, go to the Web at <http://www.doeal.gov/llnlCompetition/QuestionsAndResponses.htm>.

SCIENCE NEWS

Axion's mission: to shed light on dark matter

By Anne M. Stark
Newsline staff writer

Then there is the dark matter question. What is the dark matter that makes up 23 percent of the universe?

Lab physicists are working on the answer, and they think it comes down to a mysteriously ubiquitous particle.

A particle that hasn't truly been found yet in experiments, but when detected, will help define how our galaxy came together, the nature of quantum physics and how much of the dark matter is made up of these elusive particles.

Scientists believe the axion is a very light particle with no electric charge and only the feeblest interactions with anything. To find the axion, Lab researchers have built the Axion Dark Matter Experiment (ADMX) in the shell of a 1953 Lab building that once housed Project Sherwood, a fusion research program.

The axion experiment is quite a bit different and involves creating intense magnetic fields to detect the elusive particle. The experiment is designed to detect an axion by its decay into a single, real microwave photon in the presence of a magnetic field. It consists of three basic components: a powerful 8-tesla superconducting magnet, a high-Q and tunable cavity and ultrasensitive microwave amplifiers as the front end of a radio receiver.

"So if the axions are out there, they can convert to microwave photons in the presence of the magnetic field," said Gianpaolo Carosi, a postdoc working on the Livermore experiment. "We can check if the signal is just radio interference by turning off the magnet. If the signal disappears with the magnet off it is a strong indication that it must be coming from axions."

Though 23 percent of the universe consists of dark matter, no one really knows its make-up. Most theories contend the dark matter is a remnant from the Big Bang.

"We believe they were created abundantly in the early universe," said Karl van Bibber of the Laboratory Science and Technology Office, who co-leads ADMX with Leslie Rosenberg of the Physics and Advanced Technologies Directorate.

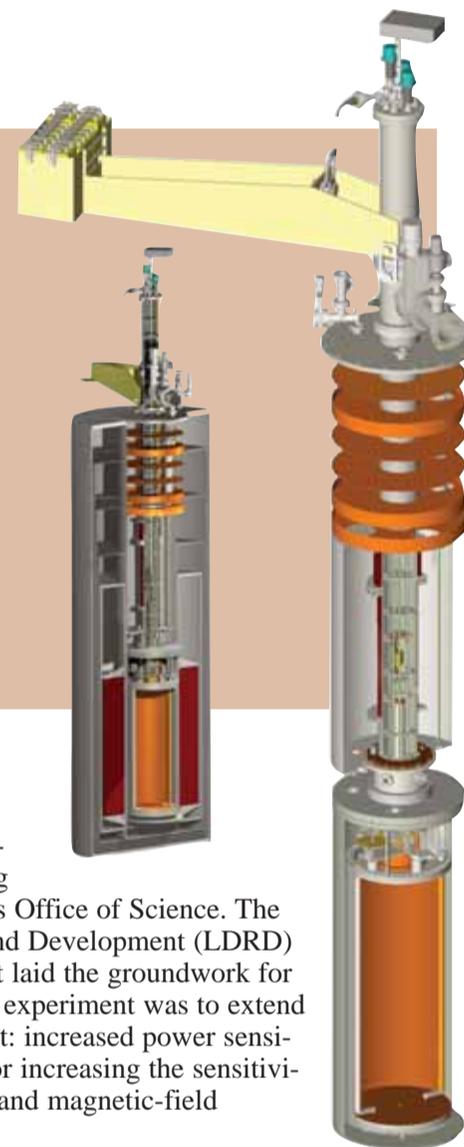
At the Earth's distance from the center of our galaxy, there are 100 trillion axions in each volume of space the size of a sugar cube.

"You, me, cars, planets, stars, etc. make up only a tiny fraction of the mass in the universe. The vast majority is some new, unseen stuff," Rosenberg said. "The discovery of axions would therefore be a scientific advance on par with the leap from earth-air-fire-water to atoms. We would suddenly understand what nature has hidden from us for so long."

The axion was first proposed as a way to explain a difficult problem in particle physics: the absence of charge-parity (CP) symmetry violation in strong, or nuclear, interactions. Charge-parity symmetry refers to the notion that the world around us would look the same in a 'mirror world' where all electric charges are reversed (C) and left and right are exchanged (P). Such violations are seen in weak interactions, and violations in strong interactions are expected to be considerably larger.

However, sensitive experiments have failed to find any evidence of strong interaction CP violation. To explain this observation, in 1977 Stanford University physicists Roberto Peccei and Helen Quinn proposed a new symmetry of nature that resulted in a par-

The axion experimental device is made up of an 8-tesla, six-ton superconducting coil wound around the outside of a copper-plated stainless steel cylinder about the size of an oil drum. A set of tuning rods inserted in the cylinder's cavity is moved by stepper motors to tune the frequency of the cavity. Amplifiers boost the faint axion signal.



ticle dubbed the axion.

The Livermore axion experiment began in 1995 with funding from the Department of Energy's Office of Science. The Laboratory Directed Research and Development (LDRD) Program supported the work that laid the groundwork for the experiment. The goal for the experiment was to extend LDRD efforts on one major front: increased power sensitivity. Livermore's plan called for increasing the sensitivity of the amplifiers and the size and magnetic-field strength of the cavity volume.

Increasing the sensitivity of the amplifiers comes in the form of SQUIDs — not the eight-armed marine creature — but a new amplifier based on a microstrip-coupled superconducting quantum interference device fabricated by LLNL scientist Darin Kinion. DOE's Office of High-Energy Physics funded the experiment upgrade with SQUID amplifiers. The cavity also has grown from the size of a coffee can of the original experiments at University of Florida and Brookhaven National Laboratory, to an oil drum-sized cylinder of the Lab's version.

The Livermore group — which also is made up of researchers from UC Berkeley, the University of Florida and the National Radio Astronomy Observatory — expect to begin the new experiments with SQUIDs later this summer.

There are two hypothetical elementary particles that are the main candidates for the make-up of dark matter: a stable weakly interacting massive particle (WIMP) and the axion. Several groups have taken up looking for WIMPs, but Livermore is sticking to axions for now.

"They are ubiquitous and weakly interacting, but their credibility is very high at this time," van Bibber said. "If we detect them, they would represent a unique window back to the time of the Big Bang. We only expect to see 100 axion conversions per second, which is a tiny portion of them."

Other Livermore participants include project manager Steve Asztalos and two undergraduate summer students, Karl Twelker and Ben Westbrook.

Westbrook got involved when he heard van Bibber give a talk about the experiment at his school, the University of San Francisco.

"This is exciting," Westbrook said. "We're probing some unknown waters because we don't even know if they exist."

But not knowing whether axions exist doesn't slow down the team for a minute.

"I believe axions are there to be found," Rosenberg said. "The case for axions has only grown stronger in time. I also can't ignore my sense of aesthetics: axions feel right and I would be greatly surprised if they didn't exist."



ON THE COVER:
CLOCKWISE FROM LEFT:
GIANPAULO CAROSI,
DARRELL CARTER, BEN
WESTBROOK AND KARL
TWELKER TEND TO THE
AXION EXPERIMENT'S
VACUUM CAN.
PHOTO: JACQUELINE MCBRIDE,
NEWSLINE.

SCIENCE NEWS

Lab hydrogen storage project gets wheels

By Anne M. Stark
Newsline staff writer

It's invisible, odorless, tasteless and lighter than air. But it can power an automobile, making it cleaner and more efficient than conventional gasoline-powered cars. Hydrogen can help replace imported oil and operate without emitting hydrocarbons, carbon monoxide or the potent greenhouse gas carbon dioxide. And it's right here at the Lab.

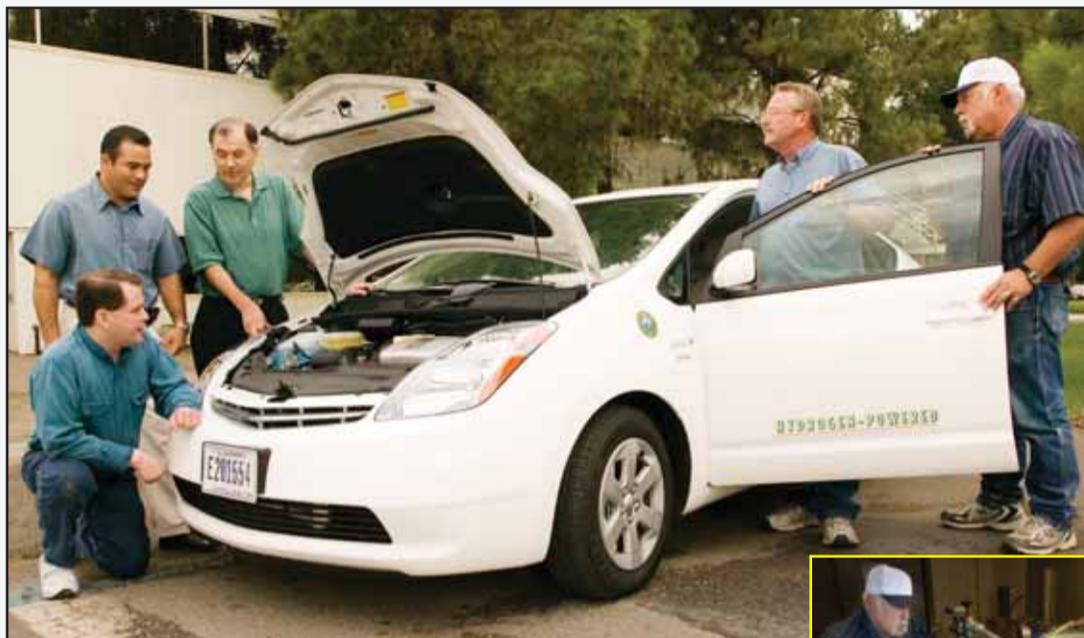
The Energy and Environment Directorate's Energy Conversion and Storage Group recently received a Toyota Prius hybrid vehicle converted to run on hydrogen instead of gasoline by Quantum Fuel Systems Technologies Worldwide of Irvine, Calif.

This isn't just a vehicle for transportation, but it serves as a means for Livermore, part of the Department of Energy's (DOE's) "National Hydrogen Storage Project" to demonstrate advanced hydrogen storage technologies in the real world. Livermore has been funded by DOE through the President's Hydrogen Fuel Initiative, launched in 2003 to accelerate research and development of hydrogen and fuel cell technologies.

Testing storage options

While most of DOE's efforts are on research for low pressure material-based options, high pressure and cryogenic tanks are being used for prototype vehicles and are currently being tested by various manufacturers. Livermore's innovation offers an approach that also can use liquid hydrogen. By developing the capabilities to test different storage options on a vehicle, Livermore will help develop a better understanding of how effective the options are.

The hydrogen hybrid Prius was delivered to the Lab with room temperature compressed hydrogen tanks that can contain 1.8 kilograms of hydrogen at a pressure of 5,000 psi, enough for the vehicle to go about 90



JACQUELINE MCBRIDE/NEWSLINE

Above: from left, Gene Berry, Francisco Espinosa-Loza, Salvador Aceves, Tim Ross and Vern Switzer display the Toyota Prius that has been converted to run on hydrogen instead of gasoline. At right: Switzer and Ross check the pressure on the cryogenic vessel that can hold hydrogen as a compressed room temperature gas, a cryogenic gas or even liquid.



miles before needing a fill-up. But Livermore researchers are moving to increase that range to exceed DOE's target of more than 300 miles by installing a cryogenic capable pressure vessel that can hold hydrogen as a compressed room temperature gas, a cryogenic gas, or even liquid (LH₂).

"This is very long range for a hydrogen vehicle because hydrogen is very difficult to store compactly," said Salvador Aceves, leader for the Energy Conversion and Storage Group.

"Filling the tank with high density liquid hydrogen (cooled to -423 degrees Fahrenheit) may allow us to achieve as high as a 500-mile range," according to Tim Ross, an engineering technician who is one of a handful of people working on the project. "This vehicle serves as a hydrogen storage technology research project. This is our test bed, which makes it very exciting."

This is the second generation hydrogen vehicle for the team. In 2004, the team installed a 3,600 psi cryogenic capable hydrogen tank on a Ford Ranger pickup truck as part of a pilot project to prove the concept of a

vehicle that could be refueled with liquid as well as ambient temperature compressed hydrogen.

Hot versus cold

One of the major barriers to hydrogen-fueled vehicles is on-board storage. In the pickup truck, a large water heater-sized hydrogen storage tank sat in the back of the truck. However, in the Prius, the size of the tank has significantly decreased, yet can hold more fuel. The tank can hold 150 liters of hydrogen (versus 135 liters for the tank used in the Ford truck).

The tank can store different forms of hydrogen on board the vehicle to best serve a driver's immediate priorities.

"You can pick the type of fuel for the type of trip you take," engineer Gene Berry said. "So on a long trip, you wouldn't want to use room temperature hydrogen because you can't go that far."

Room temperature compressed hydrogen is easier to obtain and store than the cryogenic type, but it requires a larger storage volume. With the new

Lab insulated storage tank, a vehicle could rely on room temperature compressed hydrogen for short trips and tap into the cryogenic hydrogen for longer excursions.

"This is a multi-functional tank," said Vern Switzer, another technician in the program. "We've reduced the weight and the external volume of the tank but increased the pressure and internal volume" from the larger tank used on the pickup truck.

The Livermore tank consists of a pressure vessel that is carefully insulated with many layers of shiny plastic and enclosed within a vacuum vessel. The pressure vessel was custom fabricated by Structural Composites Industries of Pomona, Calif., and the vessel was insulated at LLNL.

Insulation performance is critical for the success of this project, and has been experimentally demonstrated at the high pressure laboratory in Bldg. 343.

Working with auto makers

The Energy Conversion and Storage group has been working on alternative energy for more than a decade. The group members, Aceves, Ross, Switzer, Berry, Francisco Espinosa-Loza, Jim Fugina, Fernando Luna and Brian Kelly, are firm believers in the future environmental and national security benefits of transitioning to a clean and domestically produced fuel such as hydrogen, and are very excited about participating in the project.

The team is in contact with most domestic and foreign automakers, including General Motors, Ford and DaimlerChrysler. BMW, which has the most extensive liquid hydrogen demonstration program in the world, has expressed interest in the approach.

A successful demonstration of the Livermore technology with the Prius could help pave the way for a fleet of hydrogen-powered domestic and foreign vehicles.

NOTEWORTHY NEWS

Site 300 advances in competition to host defense facility

The Department of Homeland Security's (DHS) Science and Technology Directorate announced Wednesday that the University of California is one of 18 sites in 11 states that have advanced to the next phase in the competitive process to site the proposed National Bio and Agro-Defense Facility (NBAF). UC's planned location for the facility is at the Laboratory's Site 300.

Upon learning about UC's selection, the UC Office of the President issued this announcement:

"The University of California is pleased that the Department of Homeland Security has selected for further review the university and Lawrence Livermore National Laboratory's proposal for a National Bio and Agro-Defense Facility. We look forward to providing the Department of Homeland Security with additional information about our strong proposal.

"The University of California and the Laboratory are exceptionally poised to provide the management, operations and scientific expertise necessary for this next-generation bio and agro facility. We believe that our proposal will complement the mission of the Department of Homeland Security while providing the technical expertise to assist in securing our nation. The location of this facility in California, one of the largest economies in the world and a leading agricultural state, will create local capabilities to respond quickly to any future diseases that may result from

accidental or deliberate contagion. In addition, this facility would further attract new biotechnology industry to our state creating thousands of new jobs."

The 18 sites will now be given the opportunity to provide more detailed information in support of their submissions. By the end of 2006, DHS expects to review these more detailed submissions and narrow the potential sites to a small list of final candidates.

The short list of candidate sites will then be the subjects of environmental impact studies (EIS) following requirements of the National Environmental Policy Act. Upon completion of the EIS process, DHS expects to name the final NBAF site in early 2008.

As a joint activity with the U.S. Department of Agriculture (USDA) and the Department of Health and Human Services (HHS), DHS is developing the requirements for a next-generation biological and agricultural defense facility to enhance and protect the country's agriculture and public health. The work planned for the NBAF will address biological and agricultural national security risks by co-locating scientists from several federal agencies in a state-of-

the-art bio safety containment facility.

DHS plans to equip the NBAF with numerous laboratories that will conduct research in high-consequence biological threats involving foreign animal, zoonotic (transmitted from animals to humans), and human diseases. As a key part of this, DHS plans to house laboratories that will provide high security spaces for agricultural and animal studies and training. In addition, DHS plans for the NBAF to develop vaccine countermeasures for foreign animal diseases, and provide advanced test and evaluation capability for threat detection, vulnerability and countermeasure assessment for animal and zoonotic diseases.

DHS built a multi-agency (DHS, USDA, Department of Defense, HHS) multi-disciplinary (engineers, scientists, lawyers, academics, communicators) team to conduct the reviews of 29 interested sites for the NBAF. The teams narrowed down the list to 18 potential sites based on four criteria: acquisition/construction/operations, research capabilities, workforce and community acceptance.



Bringing HOME the 'Back 2 School Giveaway' supply campaign

There's still time to participate in the "Back 2 School Giveaway" project. The 2006 HOME Campaign's "At HOME in our Community" August project will help equip local students with all the right stuff to bring to school.

You may donate any school supply. Suggested items include: backpacks, 3-ring binders, #2 pencils, paper, markers, colored pencils, crayons, calculators, glue sticks, rulers, Sharpie pens, pencil pouches, folders, spiral notebooks and \$10 gift cards from Wal-Mart or Payless Shoes. If you would like to donate cash, please write "JTV Back-2-School" on your check or envelope.

Donations may be made by Monday, August 14. Also needed are volunteers to help during the give-away event on Saturday, August 19 from 7:30 a.m. to 3 p.m. at the Jubilee Tri-Valley (JTV) Youth Center, 841 Rincon Avenue, Livermore.

For more information call Nadine Horner at 3-9051, or Germaine Clark at 2-1135.



Last year, Lab employees donated boxes of school supplies to fill more than 60 backpacks at the Jubilee Tri-Valley Youth Center.

"No Paper Booklet" option

In order to reduce printing costs, this year's HOME Campaign is offering a "No Paper Booklet" option. You may choose not to receive a paper HOME Campaign

booklet describing the agencies. All the booklet information will be online when it becomes available and employees will be able to donate online starting in October.

If you do not want to receive a book-

let, go to the Web today, August 11, and follow the instructions. You will be placed on the "No Paper Booklet" list for future HOME Campaigns if you choose not to receive a booklet.

RETIREES' corner

Jack King (TID and Directors Office, 1988) sent greetings from southern Arizona where the temperature on July 10 was a very mild 80 degrees. He had just returned

from a trip to Honolulu where he ran into **Bob Lormand** (TID Library retired). They shared a couple of dinners and had a good talk about the "old days" when they both were in the working world. King is now preparing to return to China where he teaches the

summer session at a university in Wuhan. He finds teaching in China to be very rewarding and recommends it highly. (E-mail address: meade-king@juno.com)

David Hopkins (Plant Engineering, 1991) just returned from the longest trip in his 13 years of traveling. On Jan. 25, he flew to Cape Town, South Africa, and began a worldwide trip that took 149 days. He visited Africa, England, Australia, Hong Kong, cruised the Indian Ocean, transited the Suez Canal, visited Egypt, crossed the Mediterranean Sea, visited Italy and Hungary, took a riverboat cruise down the Danube River and visited Germany. He flew back to San Francisco on June 22. For details, go to the Retirees' Web page at

www.llnlretirees.org

Jim (Mechanical Engineering, 1996) and **Barb** (Ehlert) **Doggett** (Energy, 2002), just returned from a trip to Croatia and surrounding areas.

They stayed one week on the island of Korcula, where everyone was watching the World Cup on big screen TVs. The next week they stayed on a small island off the coast of Dubrovnik. They then visited Vienna and came down the Danube River on a hydrofoil to Budapest. In spite of the fact

that Europe was having a record heat wave, they had a wonderful time.

The August retiree luncheon will be at noon Wednesday, Aug. 16, at the Elks Lodge in Livermore, 940 Larkspur Drive. (Reservations: www.llnlretirees.org). The speaker will be Rick Morrow from Caltrans talking about "The Status of the Bay Bridge Construction."

There is no travel group meeting until January 2007. While you are traveling, take notes and consider sharing your experiences with the travel group and the Retirees' Corner when you return. Send input to Jane or Gus Olson. E-Mail: AugustO@aol.com or JaneRubert@aol.com. Phone: 925-443-4349, address: 493 Joyce St., Livermore, 94550.



PEOPLE NEWS

IN MEMORIAM

Ray Cruz Buso

Ray Cruz Buso, a 40-year Lab employee who had worked in metal fabrication, died at his home July 19. He was 90.

He was born May 3, 1916, and was raised in the Shelton area of Nebraska. He migrated to California in 1941 with his wife, Clara. He began his career welding in Bay Area shipyards. He served in the U. S. Army during World War II in the Pacific the-

ater.

He was preceded in death by daughter Jean Reed. He is survived by a son, Robert Buso, and daughter Carole Ann Deaton-Drysdale; seven grandchildren; and six great grandchildren.

Services were held in Hayward. Donations may be made in his name to the Cardiac Care Unit, Eden Hospital or Pathways Hospice in Hayward.

Rose Clinnick

Rose Clinnick died June 22 at her home in Shell Beach. She was 85.

Clinnick was born in Turlock, Calif. on April 11, 1921. After World War II, she moved to Albany, Calif. During the 1950s, she moved to Livermore and worked at the Lab.

She was an active volunteer for the Performing Arts Center in San Luis Obispo and also a former officer for the Friends of the Shell Beach Public Library.

She is survived by her husband

of 47 years, Mansfield Clinnick; son John McShea; daughters, Kathleen McShea, Carol Cullen, Diane Eisenbise, Susan Ramage, Janet McMurray; 14 grandchildren; and 12 great-grandchildren. She was preceded in death by her daughter, Mary Cobb.

At her request, no services were held. Memorial donations may be made to Friends of the Shell Beach Public Library, 230 Leeward Ave., Shell Beach, CA 93449.

Roy Mullins Jr.

Roy Mullins Jr., a physicist at the Lab for 35 years, died July 29. He was 80.

Mullins was born on April 24, 1926, in Winslow, Ariz. He was a Navy veteran and a graduate of UC Berkeley.

He was a member of the Golden Anchor Boat Club in Tracy and a member of the SIRS Men's Group of Livermore. He enjoyed spending time with family and friends and working

with wood and metal.

He is survived by his wife of 58 years, Grace Mullins; sister, Lois Bartley of El Cajon; daughter, Marigrace Parker of Livermore; and two grandchildren.

Donations may be made to the St. Jude's Children's Research Hospital, 501 St. Jude Place, Memphis, Tenn., or the Hospice and Palliative Care of Contra Costa, 3470 Busick Ave., No. 1, Pleasant Hill, CA.

NEWSLINE

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Vanpool listings available on TSMP Website

Employees may join or list a car or vanpool on the Lab's Transportation System Management Program (TSMP) Website.

To access TSMP's online car and vanpool classifieds, click on the "carpool" and "vanpool" hyperlinks: <http://www-r.llnl.gov/tsmp/>

The TSMP Website also provides information about: forming a car or vanpool; car and vanpool parking permits; commuter bus routes and schedules; links to public transit agencies including Ace Train; pre-tax transit and vanpool advantages; the guaranteed ride home program; advocacy for commute problems; and a commute costs calculator.

In addition, TSMP offers information on Lab taxis, shuttles and bicycles as well as the health benefits of walking and jogging.

Tricolored Blackbird wings it at Lab's Site 300

The Tricolored Blackbird (*Agelaius tricolor*), a state and federal species of special concern, is a gregarious species, with more than 99 percent of its entire population found in the Central Valley, notably at Site 300.

These birds form huge breeding colonies in wetland, riparian and agricultural areas near favorable vegetation — such as bulrushes, willows, or barley — and ample water. When conditions are ideal, Tricolored Blackbird colonies have been known to get as large as 300,000 adult birds with 200,000 nests, though colonies of this magnitude have not been recorded since 1935.

These enormous colonies likely have disappeared due to the species' remarkable population decline.

The Tricolored Blackbird population was once more than one million birds strong. However, half of the population was lost between the mid-1930's and the mid-1970's, and it has continued to fall ever since. The reasons for the plummeting population are many, but chief among them are habitat loss and agricultural harvesting operations, which causes Tricoloreds' nests to be destroyed when the nesting habitat is harvested.

Although Tricolored Blackbirds continue to lose breeding sites through habitat alteration, there are protected areas and refuge opportunities for this species. Areas relatively free of human disturbance that contain proper vegetation and a nearby perennial water source can provide refuge to nesting Tricolored Blackbirds. State and federal lands in the Central Valley provide safe haven to the species, and organizations such as the Nature Conservancy fully compen-



By Brian Spirou



MICHAEL VAN HATTEM; INSET PHOTOS: BRIAN M. SMALL

Tricolored Blackbird adults are most easily confused with Red-winged Blackbirds. Tricoloreds are distinguishable by a squared tail (the tail is more rounded in the Red-winged blackbird), a longer and narrower bill than the Red-winged, and a narrower and more pointed wing shape. A miniscule portion of a Tricolored Blackbird colony is shown. Insert left: a male Tricolored. Insert right: a female Tricolored.

sate farmers who suspend harvesting operations in favor of Tricolored Blackbird breeding. Site 300 is one such breeding ground.

In June, a colony of about 1,000 nests was found in Site 300's Elk Ravine — representing the first Tricolored Blackbird colony detection at Site 300 since 2002. Tricoloreds typically occupy breeding sites on a three-year cycle, thus the detection of a colony in 2006 in Elk Ravine, while a year late, was expected. A recently completed restoration project has increased the habitat suitability of Elk Ravine, and the current year's colony was estimated to be 15 percent larger than the colony seen in 2002.

During the fall of 2005, a riparian habitat restoration project was completed in Elk Ravine. This project involved the construction of deep stream pools, which ensured availability of perennially present water near the breeding site. With ample water now available throughout the breeding season, the cyclical Elk Ravine Tricolored colony may continue to grow, thus contributing to the overall population recovery of the species.

With similar wetland/riparian restoration projects underway throughout the Central Valley, the Tricolored Blackbird has a better chance of making population gains. If these gains occur, Site 300 will not only have aided the species in its recovery, but it will have done so while demonstrating that conservation efforts can co-exist with technological and economic progress.

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REFERENCE: BEEDY, E. C., AND W. J. HAMILTON III. 1999. TRICOLORED BLACKBIRD (*AGELAIUS TRICOLOR*). IN THE BIRDS OF NORTH AMERICA, No. 423 (A. POOLE AND F. GILL, EDS.). THE BIRDS OF NORTH AMERICA, INC., PHILADELPHIA, PA.

Congressional visit



JACQUELINE MCBRIDE/NEWSLINE

From left: Lynn Kissel of the Advanced Simulation and Computing Program, Dona Crawford, associate director for Computation, Rep. Zoe Lofgren of San Jose, and Lab Director George Miller tour the Terascale Simulation Facility Wednesday. Lofgren also received a briefing on homeland security programs.



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